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10/599,570	01/31/2007	Stephen Peter Hughes	102881-15 (FF39694/06)	1933

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EXAMINER

TAKEUCHI, YOSHITOSHI

ART UNIT	PAPER NUMBER
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4162

MAIL DATE	DELIVERY MODE
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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/599,570	Applicant(s) HUGHES ET AL.	
	Examiner YOSHITOSHI TAKEUCHI	Art Unit 4162	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 Jan 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 October 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>2 October 2006</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

1. Claims 1 and 7 are objected to because the non-American English version of spelling “sulfide” as “sulphide” was used. Appropriate correction is required.
2. Claim 11 is objected to because the word “from” is misspelled as “rom.” Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 2, 6-8, and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Kekich (US 1,922,301). Kekich teaches a process with the steps of: adding the copper sulfide matte (page 1, lines 2-3) and flux (page 3, lines 11-12) to a suitable agitated slag phase; and injecting, from a discharge tip at the lower end of a top-submerged tubular lance, an oxidizing gas suitable for reacting with the matte to produce blister copper which forms or adds to a continuous blister copper phase below the slag phase; wherein the lance tip is located within the slag phase at a depth enabling the injected gas to agitate the slag phase, and to react with copper

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sulfide matte dispersed therein, while precluding a substantial portion of the gas from contacting the continuous blister copper phase (page 2, lines 20-36 and 64-80).

Regarding claim **2**, Kekich teaches the slag phase has a depth which enables agitation of the slag phase by the top submerged injection therein without a stream or jet of the injected gas passing through the lower surface of the slag phase. (Page 2, lines 64-74).

Regarding claim **6**, Kekich teaches the injection near the upper surface of the slag phase. (Page 2, lines 34-39).

Regarding claim **7**, Kekich teaches an injection directed downwardly and laterally outwardly. (Figure 3, where the lances are flared, so that the gas has vertical and lateral displacement). In addition, Kekich teaches the gas moves from a downstream orientation to an upstream, which implies the gas must move laterally to clear the vertical tube before moving upwards. (Page 2, lines 70-72).

Regarding claim **8**, Kekich teaches a slag phase with iron and silicate. (Page 3, lines 6 and 11).

Regarding claim **13**, Kekich teaches the use of carbon which is introduced as a fuel to be burned with co-mixed air (page 1, line 36), so the carbon is a reductant.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject

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matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. The factual inquiries set forth in Graham v. John Deere Co., 383 U.S. 1 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 3, 4, 5, 13, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kekich (US 1,922,301). Kekich teaches a process with the steps of: adding the copper sulfide matte (page 1, lines 2-3) and flux (page 3, lines 11-12) to a suitable agitated slag phase; and injecting, from a discharge tip at the lower end of a top-submerged tubular lance, an oxidizing gas suitable for reacting with the matte to produce blister copper which forms or adds to a continuous blister copper phase below the slag phase; wherein the lance tip is located within the slag phase at a depth enabling the injected gas to agitate the slag phase, and to react with copper

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sulfide matte dispersed therein, while precluding a substantial portion of the gas from contacting the continuous blister copper phase (page 2, lines 20-36 and 64-80).

Regarding claims **3** and **4**, Kekich does not explicitly teach a slag phase having a depth of from about 500 mm to about 2 m or depth of from about 700 mm to about 1.7 m. However, it would have been obvious to one having ordinary skill in the art at the time of the invention to adjust the depth of the slag phase for the intended application, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272 (CCPA 1980).

Regarding claim **5**, Kekich teaches the injection at the upper surface of the slag phase (Page 2, lines 34-39) , but does not teach the injection at the mid-region of the height of the slag phase. However, it would have been obvious to one having ordinary skill in the art at the time of the invention to adjust the height of the injection for the intended application, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272 (CCPA 1980).

Regarding claim **14**, Kekich teaches the use of carbon, which may be of “any suitable character” (page 3, lines 21-22) for the purpose of being used as a fuel (page 1, line 36), but does not teach the use of lump coal as a reductant. However, since lump coal is a source of carbon and a well-known fuel, it would have been obvious to one of ordinary skill in the art at the time of the invention to use lumps of coal as a reductant as an alternative fuel in order to introduce carbon into the melt.

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9. Claims 8-12, 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kekich (US 1,922,301) in view of Edwards (US 5,888,270).

Regarding claims **8**, **9** and **10**, Kekich does not teach a ferrous calcium silicate slag. Edwards teaches a process for converting a copper sulphide matte to blister copper by adding a flux to the matte in an agitated molten bath containing molten slag phase; injecting by an oxidizing gas through a submerged lance to form a low sulfur blister copper phase and slag; and separating blister copper from the bath. (Abstract). Edwards teaches a ferrous calcium silicate slag (column 2, line 51-52), where the slag is preferably highly oxidized, so includes ferrous oxides, calcium oxides and silica (column 2, lines 49-51). It would have been obvious to one of ordinary skill in the art at the time of the invention to use a ferrous calcium silicate slag since Edwards teaches that it is preferred for the main components of a slag to be highly oxidized, where preferred components include ferrous oxides, calcium oxides and silica.

Regarding claims **11** and **12**, Kekich does not teach specific ratios of Fe to SiO₂, or the use of CaO. However, Edwards teaches the use of Fe, SiO₂, and CaO. (Column 2, lines 50-51). “[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.” In re Aller, 220 F.2d 454 (CCPA 1955). In this case, Edwards does not specify the workable ranges for the ratios between Fe to SiO₂, CaO to Fe, and CaO to SiO₂, but it does describe the general conditions of the claim, namely the use of Fe, SiO₂, and CaO. It would have been obvious to one of ordinary skill in the art at the time of the invention to discover the workable ranges of the materials of Edwards by routine experimentation.

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Regarding claim **15**, Kekich does not teach the iron based silicate slag is a lime modified iron silicate slag. However, Edwards teaches the iron based silicate slag is a lime modified iron silicate slag. (Column 10, lines 11-15). As Edwards teaches that lime modified iron silicate slag is a known source of slag for copper conversion, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the slag taught by Edwards in the copper conversion process of Kekich as it is demonstrated to be a known material for use in this process.

Conclusion

Any inquiry concerning this communication or earlier communications from the - examiner should be directed to YOSHITOSHI TAKEUCHI whose telephone number is (571) 270-5828. The examiner can normally be reached on Monday-Thursday 9:30-3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on (571) 272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would

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like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Yoshitoshi Takeuchi/

/Jennifer McNeil/

Supervisory Patent Examiner, Art Unit 4162